

Shipboard Environmental Protection News



Issue No. 2

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I N S I D E

POLICY & PROCEDURES

- 2** • NAVSEA Issues Environmental Policy
- NAVSEA 03 Prepares Strategic Plan

OZONE-SAFE SUBSTANCES

- 4** • Protocol Meeting Makes Changes
- Navy Wins 3 "Best of the Best" Awards
- 5** • 200-Ton AC Conversion Plants
- New MILSPECS
- DLA Needs Your Cylinders!

SOLID-WASTE STATUS

- 6** • PWP Installation Certification
- Afloat Equipment Training: Solid Waste Equipment Guide, Video, and More
- 7** • Coming to a Ship Near You: Solid Waste Pulpers Are a Big Hit!
- Solid Waste Conferences Coming Soon

LIQUID-WASTE LOWDOWN

- 8** • The Future for Oily Waste, Graywater, and Blackwater
- Thermal-Destruction Design Improvements Pay Off Twofold
- 10** • Ring-Gauge Isolator for Blackwater
- Clearinghouse Web Page Highlights
- Paints: NESHA's Got You Covered

P²A & HAZMAT HAPPENINGS

- 11** • Ship-Class-Specific HAZMINCENs
- Solvent P-D-680 Type II Update

PEOPLE & PLACES

- 12** • Farewell to Fellow CFC Eliminators David Breslin and Greg Brunner
- 13** • Spotlight on NAVSEA 03L's Brad Smith and John Julian
- Tony Rodriguez Gets Promoted
- Alphabet Soup for Non-Navy Types
- 14** • Your Points of Contact for All Shipboard Environmental Issues
- 15** • Calendar of Events
- Mailing-List Change Form
- 16** • SEP News Contributors
- What Is the Clearinghouse?

The Navy's Vision of Environmentally Sound Ships of the 21st Century

Working Hard to Achieve Our Goal

In 1989, the Chief of Naval Operations established the Navy's goal of *environmentally sound ships of the 21st century*. The following paragraphs explain that goal.

What Do We Mean by "Environmentally Sound Ships?"

The "environmentally sound ship" concept has evolved to include the following attributes:

- Compliance with all applicable environmental laws and regulations;
- No significant adverse environmental impacts;
- Wastes treated or destroyed on board to the extent practicable;
- No inappropriate dependence on shore facilities for waste off-load and disposal;
- Minimal energy consumption;
- Minimal logistical costs for waste management; and
- Minimal use of hazardous materials.

The Navy has a comprehensive strategy to achieve environmentally sound ships of the 21st century (ESS-21) and has made much progress toward developing ways to treat or process ship wastes on board.

We must integrate shipboard pollution-control systems into ship designs early in the

*All Navy ships must be
environmentally sound ships*

ship-design process while basic concepts are forming, to set aside enough space on board and make the most of the overall design.



Operating responsibly with nature: Navy's environmentally sound ships of the 21st century

Much research, development, testing, and evaluation must be done.

Why Do We Want Environmentally Sound Ships?

Ship Operations

Currently, ship operations are constrained in some international and territorial waters because ships lack appropriate shipboard waste-management systems to comply with waste-discharge limitations.

Ships cannot remain close to shore for extended periods without moving specified distances offshore to discharge sewage and solid wastes. Similarly, ships without special waste-processing equipment cannot operate long in MARPOL-designated *special areas*, where all solid-waste discharges, except food wastes, are prohibited. Without satisfactory onboard waste-treatment systems, we may be forced to avoid visits to some ports where ships cannot meet local waste-discharge limitations. Ideally, the ESS-21's worldwide operations would have minimal potential for restrictions by environmental regulations so we can operate anywhere, anytime.

continued on page 3



NAVSEA Issues Environmental Protection Policy



In keeping with the NAVSEA Strategic Plan's Safety and Environment Strategic Goal (see article at right), RADM Coyle issued on 30 July the following policy: "NAVSEA 03 Environmental Protection Policy is to prevent or mitigate environmental impact caused by naval ships and shipboard systems. Environmental protection shall be considered a design constraint when evaluating cost, schedule, and performance of systems under development and for product improvement of those that have been deployed. The environmental impact of proposed actions shall be considered by the cognizant engineer, and a mitigation plan developed where required. This policy supports unrestricted naval operations by developing, producing, installing, and managing all shipboard equipment, systems, and procedures to reduce and manage shipboard wastes in compliance with existing and anticipated environmental restrictions worldwide without jeopardizing ship mission, survivability, or habitability.

"Specific shipboard solutions are driven by many factors, including international, National, and local regulations, need for affordable systems, Fleet operational needs, and ship-design constraints. The goal of this policy is to achieve the CNO vision for the environmentally sound ship of the 21st century."

For a complete copy of this policy letter from NAVSEA 03's RADM Coyle, contact the Clearinghouse!



Stopping beach litter: Navy volunteers coordinate and participate in many beach cleanups around the United States every year.

"We Are Ships...": NAVSEA 03's Strategic Plan

Plan Includes New Safety and Environment Goal

VADM Sterner, NAVSEA Commander, recently signed a revised Strategic Plan including this Safety and Environment Strategic Goal:

Take the lead in effectively integrating pollution prevention and safety into the design and life cycle of our ships, systems, and ordnance, into the execution of our processes, and into the operation of our facilities.

The ship-related strategies to implement this goal are to develop and implement criteria for:

- ◆ Acquiring and upgrading our ships and weapons systems to comply with environmental and safety requirements throughout their life cycle;
- ◆ Maintaining and disposing of our obsolete ships and weapons systems in compliance with applicable requirements; and
- ◆ Pursuing opportunities to institute more efficient process or regulatory controls.

The Plan also identifies four ways to effect these strategies:

- 1 Integrate environment and safety considerations into design decision-making and problem-solving processes.
- 2 Increase communication with NAVSEA Team members, regulators, industry partners, and surrounding communities to inform one another and understand each other's concerns and needs.
- 3 Reduce injuries, illnesses, and Federal Employee Compensation Act costs.
- 4 Anticipate and influence, where appropriate, regulations and requirements.

The NAVSEA 03 Team tasked with implementing the Safety and Environment Strategic Goal is developing metrics to measure and evaluate progress. The Team determined that the key issues and actions are incorporated in the environmentally sound ship concept. NAVSEA must affordably manage waste streams in the design stages with the goal of ships being consistently in compliance. NAVSEA must pursue technologies to reduce or eliminate waste streams. NAVSEA should leverage the effort under the Uniform National Discharge Standards (UNDS) rule-making to focus on marine pollution control devices that minimize discharges.

The metrics that NAVSEA 03 will use to monitor progress towards achieving environmentally sound ships will focus on shipboard pollution control equipment installations, specifically the planned versus actual installations. Each waste stream or environmental pollutant for which NAVSEA plans equipment installations, the percentage of total installations completed versus the planned percentage, will be used as a measure of progress for that waste stream. For waste streams and contaminants for which no equipment has been approved or anticipated, the metric would be progress with appropriate RDT&E or acquisition.

Your NAVSEA POC: LCDR Stephen Markle, NAVSEA 03L1B, 703/602-8144 x207, markle_stephen_p_LCDR@hq.navsea.navy.mil

BAFFLED BY A PLETHORA OF ACRONYMS? See page 13 for **ALPHABET SOUP FOR NON-NAVY TYPES**, a quick-reference glossary to help guide you through this newsletter!

Did You Know...?

- ▶ **Important!** The Clearinghouse has a **new** phone number: **703-416-1132**
- ▶ Over the last 4 years, the CFC/Halon Elimination Team converted 40 percent of the Fleet's CFC-12 AC&R plants to HFC-134a, including the first submarine. This is equivalent to about 100,000 pounds of installed charge, 100 "CFC-12-free" ships!



Environmentally Sound Ships: Navy's Vision of the Future

continued from page 1

Another reason for minimizing waste discharges from ships is to reduce "waste signatures." Floating debris discharged by ships may provide useful information for potential adversaries. It also causes problems for military operations: during coalition operations in the Persian Gulf, for example, floating plastic bags resembled floating sea mines.

The Vision of the ESS-21

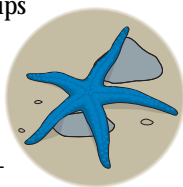
- Navy ships must operate worldwide without causing significant adverse environmental impacts, while complying with all applicable environmental requirements.
- In the future, all wastes should be destroyed on board. Wastes that cannot be destroyed on board will be treated so that the resulting discharges will be environmentally benign.

Logistics

Environmentally sound ships, which are self-contained and independent of shore facilities for shipboard waste management, can reduce logistical requirements and costs. Today, ships visiting some ports can pump liquid wastes to pierside reception facilities and off-load solid waste and excess hazardous material for disposal. In some ports, however, visiting ships often must pay substantial costs for private contractors to dispose of ship-generated wastes. The more wastes ships can destroy on board, the lower the waste-disposal costs and the simpler the logistical arrangements.

Public Relations

Environmentally sound ships also demonstrate strong Navy leadership in protecting the environment. Besides, the public expects us to do as much as possible to protect global marine resources.



Showing environmental leadership enhances our pride and public image. Public perception of the environmental impact of naval operations has a significant influence

on public support. Taking the extra effort to show our commitment creates goodwill, avoids negative news-media coverage, and helps maintain good relations with National legislators and environmental agencies. Without their cooperation and understanding of ship-operators' problems, we risk unreasonable environmental requirements and compliance schedules.

How Do We Achieve Environmentally Sound Ships?

Pollution Prevention or Pollution Control

For each potential environmental problem, we must try to *prevent* the waste generation at the source or, if that is impossible, *control* or treat the waste so that its discharge does not become an environmental problem.

► **Pollution Prevention (P²):** Use fewer environmentally harmful substances and generate less waste on board.

► **Pollution Control:** Increase treatment, processing, or destruction of wastes on board.

The basic P² principles follow:

① **Eliminating** the use of environmentally harmful chemicals, such as ozone-depleting substances (ODSs), toxic antifoulant hull coatings, and other hazardous materials, may be the best approach for some potential problems.

② **Reducing** the amount of waste we generate on board is often better than treating it on board: for example, reducing the amount of plastics and other packaging materials taken aboard may simplify solid and plastics-waste management. Similarly, reducing the volume of liquid

wastes generated (such as graywater) may simplify onboard liquid-waste treatment.

For the wastes and hazardous materials that cannot be prevented, we must develop pollution-control strategies and technologies.

Shipboard Wastes and Emissions

The Navy must control the following conventional wastes and emissions to achieve ESS-21:

- Oily wastes;
- Non-oily wastewater;
- Solid wastes (paper, metal, glass, food waste, and plastics waste);
- Used/excess hazardous materials;
- Air emissions; and
- Antifoulant paint leachates.

The chart below shows the Navy's strategy for treating or eliminating these wastes in the year 2000 and beyond. How do we find appropriate solutions for controlling these waste streams and emissions? We are looking for ways to reduce, eliminate, treat, destroy, or process each one on board, so that discharges are environmentally acceptable or the processed waste can be stored safely on board and returned to shore for disposal or recycling. Still, however, we will need to provide waste-treatment capabilities on warships, which presents major challenges.

➡ Read this and other issues of *Shipboard Environmental Protection News* to track our progress! 🚢





Tenth Anniversary Montreal Protocol Meeting Rejects HCFC Phaseout Acceleration, Strengthens CFC Trade Controls



Some 110 governments attended the 10th Anniversary Meeting (9th Meeting of the Parties) of the Parties to the Montreal Protocol, held from 15 to 17 September 1997 in Montreal, Quebec, Canada, where several important decisions were reached, including the tightening of restrictions on several destructive chemicals.

The meeting agreed on a phaseout schedule for methyl bromide, a fumigant that until this meeting was the most important ODS whose phaseout by developing countries had not yet been established. It also set up a licensing system to help governments track international trade in CFCs and other controlled substances and discourage illegal sales.

"We have succeeded in maintaining the Montreal Protocol's momentum by adding important new protections for the ozone layer," the meeting's president, Dr. Won-Hwa Park of Korea, said. "We need to follow up now with strong enforcement of these new commitments."

Under the methyl-bromide agreement, the phaseout by developed countries, previously set at 2010, has been moved up to

2005 with exemptions for "critical uses" and interim reductions of 25 percent by 1999, 50 percent by 2001, and 70 percent by 2003. Developing countries, previously committed only to a freeze by 2002, have agreed to a 20-percent reduction by 2005 and a phaseout by 2015. They will use a 4-year average of 1995 to 1998 as the base year for calculating the phaseout; the interim reduction schedule will be reviewed in 2003.

In addition to the \$10 million agreed to last year for funding demonstration projects testing the feasibility of methyl bromide alternatives, the Multilateral Fund will make \$25 million per year available in both 1998 and 1999 for activities to phase out methyl bromide in developing countries. Starting a year after the agreement enters into force, Parties will ban trade in methyl bromide with non-Parties.

The new licensing system for controlling trade will be based on licenses issued by Parties for each import and export and on regular information exchange between Parties. This will enable customs and police officials to track trade in CFCs and to detect

unlicensed trade. The system will become effective at the start of 2000.

Another decision adopted by the meeting requests developed countries to consider banning the sale of their stockpiles of virgin CFCs anywhere in the world, except for meeting the "basic domestic needs" of developing countries or for exempted "essential uses." This is important for preventing these stocks from entering the black market.

Proposals by the European Community (EC) and Switzerland to accelerate the phaseout of HCFC use from 2030 to 2015 or earlier and to introduce production control were not accepted. This phaseout acceleration had been strongly contested by the U.S. delegation and many of the developing-country delegations. The EC and Switzerland urged that the issue be revisited at a future meeting.

➔ View a complete report of the meeting at the United Nations Environment Program Ozone Secretariat's Web site: <http://www.unep.org/unep/secretar/ozone/9mop.htm>

Navy Wins Three EPA "Best of the Best" Ozone-Protection Awards



The U.S. Environmental Protection Agency (EPA) presented 71 Stratospheric Ozone Protection "Best of the Best" awards on 14 September 1997 to organizations and individuals from around the world, including three from the U.S. Navy.

These awards celebrate the extraordinary level of commitment, cooperation, and investment by researchers, governments, corporations, associations, and individuals around the globe that ensured the success of the Montreal Protocol over the past 10 years.

Below are the U.S. Navy award winners:

Naval Research Laboratory (NRL). NRL's Navy Technology Center for Safety and Survivability has played a key role in the Navy's overall ODS-elimination program,



Dr. Ronald Sheinson from NRL

combining laboratory, intermediate-scale, and real-scale testing facilities with the innovative ideas of its staff to identify environmentally acceptable Halon replacements. The Center identified and qualified a non-ozone-depleting gas to replace Halon 1301 in discharge testing, resulting in 60-percent reduction in Halon 1301 emissions, and developed a training extinguisher that uses water instead of Halon 1211. The Center also selected and tested numerous halocarbon alternatives to Halon 1301, resulting in the selection of hydrofluorocarbon HFC-227ea, a non-ozone-depleting alternative to Halon 1301, for use aboard the Navy's newest ships; invented a hybrid gaseous agent-water spray

continued on page 12



PROGRAM UPDATE

200-Ton Air-Conditioning Plant Conversion Kit Nears Completion

The conversion kits for the 200-ton CFC-114 air-conditioning (AC) plants are entering their final development phase. The Navy successfully converted its CG-47 and DDG-51 AC plants, which have operated in the laboratory for over 1,200 and 2,000 hours, respectively, to refrigerant HFC-236fa. The converted plants exceed the original plant-design requirements. The variable geometry diffuser compressor has increased the operating range, increased efficiency at part loads, and reduced structureborne noise levels at part loads. Both plants have produced design capacity with no change in power consumption at 88 °F condenser water inlet temperature. Stable plant operation is now possible with condenser water inlet temperatures up to 95 °F. Hot-gas bypass operation is no longer required to produce part loads and results in a significant power reduction at these conditions.

NSWCCD has removed the converted CG-47-Class AC plant from its test site at the Annapolis Detachment and shipped it to York International to begin the series of tests required to receive shock and vibration certification. York will perform baseline acous-

tic and capacity tests. The plant will then be shipped to Hi-Test Laboratories in Arvon, VA, for a floating shock platform shock test and a Type-I vibration test from mid-December to mid-January. After successful completion of these tests, the plant will return to York for post-acoustic and capacity testing and post-shock inspection of the compressor.

The qualified conversion-kit design will be installed on the USS *Normandy* (CG-60), to perform a validation of the shipboard conversion instructions and a 1-year at-sea demonstration. Two kits will be installed on the *Normandy* during the upcoming regular overhaul starting in May 1998. Production kits will be installed on additional CG-47-Class ships starting in FY 1999.

✉ Your NSWCCD Annapolis POC: Mr. Tom Bein, Code 822, 410/293-3344, bein@oasys.dt.navy.mil

✉ Your NAVSEA POC: Mr. Greg Toms, NAVSEA 03L14, 703/602-9025 x501, DSN 332-9025 x501, toms_greg@hq.navsea.navy.mil



The Navy's conversion kits for the 200-ton CFC-114 air-conditioning plants are entering their final development phase. The CG-47 and DDG-51 plants have been successfully converted to the ozone-friendly refrigerant HFC-236fa.

MILSPECS

Ozone-Friendly Military Specifications Update

- MIL-A-356, Revision A; MIL-A-82842; and MIL-P-16406, Revision A, have been cancelled by Notice 1, of 15 October 1996, and are not superseded by any other document.
- MIL-P-21415, Revision C, has been cancelled by Notice 1, of 16 October 1996, and is not superseded by another document.
- MIL-STD-1330, Revision D, of 20 September 1996, removes all ODS references.
- MIL-L-24479, Revision C, has been cancelled by Notice 1, of 7 August 1997, and is superseded by A-A-59004.
- MIL-C-81964, Revision A, and MIL-C-83360, Revision C, have been cancelled by Notice 1 and 4, respectively, dated 19 September 1996, and are superseded by MIL-PRF-29608(AS).
- MIL-PRF-29608(AS), dated 19 September 1996, contains no ODS references (non-ODS).



Do *you* have any empty refrigerant or Halon cylinders? If so, please return them to Defense Supply Center Richmond!

✉ Your POC: Mr. Steve Minus, DSCR, 804/279-5203, DSN 695-5203

Plastics Waste Processor Installation Certification Process


NAVSEA now provides a onetime installation certification for each ship to facilitate the rapid integration of solid waste management equipment into normal daily shipboard routine.

Future ship installations will have in-process inspections by the In-Service Engineering Agent (ISEA) at NSWCCD-SSES at the 50-, 75-, and 90-percent completion points, with comments provided to the naval activity supervising the installation. This will help identify deficiencies early in the installation process and provide timely corrective actions. The ISEA will perform a formal inspection at the 100-percent

**The PWP status
as of December 1, 1997:
94 ships certified; 120
installations done!**

point and report minimum-impacted deficiencies by naval message from NAVSEA to the installing activity.

Once the installation is complete, the ISEA will perform a Light-Off Certification Inspection to verify the material condition of the installation, review the Integrated Logistic Support (ILS) package, and provide supplemental crew hands-on training.

Ships with a PWP already installed will be certified as well. NAVSEA is currently reviewing outstanding deficiencies for each ship. Certification messages will be sent to each ship indicating that the equipment is safe to operate and providing work-arounds where required. If deficiencies are found that preclude the safe operation of the equipment, certification will be made contingent on correcting them. Some deficiencies will be addressed by specific work-around measures, and the non-critical ones will be deferred until a later availability. 

Navy Afloat Environmental Protection Equipment Training



As reported in the summer issue of *Shipboard Environmental Protection News*, the Navy has embarked on an aggressive schedule to install solid waste management equipment on all ships FFG-7-class and larger. The key to this program's success is crew training and developing a ship-specific solid waste management organization. *OPNAV Instruction 5090.1B: Environmental and Natural Resources Program Manual*, provides guidance for environmental compliance afloat in Chapter 19; Chapter 24 provides training requirements for all hands.

Ship training includes specifics for equipment operators and maintainers and for all hands in the art of waste segregation at the generation site. All equipment operators and maintainers should complete the Interactive Courseware (ICW), the single source of initial and follow-on training. This training is supplemented during the equipment Light-Off Certification Inspection conducted by the In-Service Engineering Agent (ISEA) at NSWCCD-SSES (see article above).

Additional training information is available to educate all hands. The Navy has developed and sent to all surface ships a 10-minute PWP training video, *War on*

Pollution: The U.S. Navy's New Weapon to Fight Plastic Pollution at Sea.

Tips: Shipboard Solid Waste Management Equipment Guide

In September 1997 NSWCCD published the Shipboard Solid Waste Management Equipment Guide, which provides general equipment information, compilation of Fleet lessons learned, and draft ship instruction and Job Qualification Requirements (JQR) for safe operation of the equipment.

The Guide was published to help ship Commanding Officers and Sailors manage solid waste from generation to final processing. It describes equipment operations and functions, waste-handling procedures, the duties and responsibilities of everyone on board, and important safety and health issues. It also discusses operator training, both in the electronic classroom and on the job, and equipment logistics-support elements.

Most important, the Guide promotes the development of a ship-specific plan that addresses the flow and processing of shipboard solid waste from start to finish, including an example plan as a starting point for each ship's own, tailored plan.

The Guide also discusses manning issues. NAVSEA has requested a study to review manning impacts of shipboard solid waste


equipment installation, scheduled for completion by spring 1998, and chose the USS *John C. Stennis* (CVN-74) as the platform. Study results will be incorporated in the next promulgation of the Guide.

Together, the Guide, ICW, and equipment Technical Manuals form the backbone for establishing an effective ship organization.

Package Sent to All Ships

In October 1997, NAVSEA mailed to the Commanding Officer of every Navy surface ship a special environmental awareness package including the following:

- ◆ "Personal For" copy of the summer 1997 *Shipboard Environmental Protection News* newsletter;
- ◆ OPNAV U.S. Navy Pollution Discharge Restrictions "whiz wheels;"
- ◆ PWP training video, *War on Pollution*;
- ◆ Fleetwide Environmental Survey results; and
- ◆ Shipboard Solid Waste Management Equipment Guide (with a computer disk containing sample shipboard instruction and JQRs). See sample JQRs and instruction at <http://www.navyseic.com> (under solid waste).

✉ Your POC for the October mailing: Debbie Holter, 703/602-8144 x251 



PROGRAM UPDATE

Coming to a Ship Near You: Solid-Waste Pulpers Are a Big Hit!



Plans are in the works to equip the entire Fleet with the Navy's shipboard solid-waste pulpurs by the end of the year 2000. The pulper (especially the large pulper) is the machine into which you dump tremendous quantities of paper, cardboard, or food waste. The waste mixes with seawater to form a slurry, which is then discharged overboard. Studies show an immediate 100,000-to-1 dilution when discharged into the wake of a ship. The large pulper can process more than 500 pounds of paper and cardboard, 1,000 pounds of food waste, and 680 pounds of mixed waste per hour.

Plans are in the works to outfit the entire Fleet with these impressive garbage grinders by 2000

NAVSEA (SEA 03L), through NSWCCD (Code 634) and GEO-CENTERS, Inc., developed the large pulper and its little brother, the small pulper, from 1992 to 1994. The small pulper was designed as a downsized version of the large pulper for small, space-and-weight-critical ships that don't need the processing performance of the large unit. The small pulper also is used on aircraft carriers to process the pulpable waste from the dirty-shirt wardroom. Per hour, the small pulper can process 100 pounds of paper/cardboard, 200 pounds of food waste, and 140 pounds of mixed waste. An Engineering Development Model of the large pulper was first installed on the aircraft carrier USS *Theodore Roosevelt* (CVN-71) in 1992. Information gained from installing and operating this unit supported subsequent design modifications and enabled the 1994 installation of both a large and small pulper on the aircraft carrier USS *George Washington* (CVN-73) for formal

Technical and Operational Evaluations, which both units passed with flying colors. A NAVSEA Acquisition Review Board granted approval for full production in March 1995. Several ships were then or already had been outfitted with preproduction prototype pulpurs to obtain additional operating hours and shipboard experience with them. Large pulpurs also have been installed on another carrier, the USS *John C. Stennis* (CVN-74), the amphibious ship USS *Wasp* (LHD-1), and the command ship USS *Coronado* (AGF-

11). These ships have accrued over 16,000 operating hours while processing about 4,000,000 pounds of waste without a single critical failure! Such incredible reliability attests to the rugged simplicity of the machine and the talent of the Navy design team.

Not only are the pulpurs extremely effective and reliable, but they offer several major advantages over the traditional waste-disposal strategy of "throwing it off the fantail." No unsightly trash trail follows the ship or provides clues to the ship's position, plus the slurry is a much more benign and environmentally assimilable discharge. Federal law allows pulped waste to be discharged in MARPOL special areas (e.g., the Baltic Sea), where solid waste discharges are not allowed at all and pulping is allowed beyond 3 nm of any shoreline. Ships must be more than 25 nm from shore to discharge unprocessed solid waste (if allowed at all). Also, because the pulped slurry is discharged at the waterline, it cannot create a foreign-objects-and-debris hazard, which means that carriers and other ships that conduct flight opera-

tions do not have to wait until flight operations are over to dispose of their waste. Ships equipped with a pulper can dispose of their paper, cardboard, and food waste just about anywhere and at anytime—at sea.

NAVSEA now is acquiring large and small pulpurs for installation in the Fleet. Two contracts were awarded in November 1997 for each contractor to manufacture 46 large pulpurs and 11 small pulpurs. Planning yards have selected installation spaces aboard all ship classes destined to receive pulpurs and the SHIPALTs to install them are being developed. 🐬



The Navy's large solid-waste pulper can process more than 500 pounds of paper and cardboard, 1,000 pounds of food waste, and 680 pounds of mixed waste per hour!

Stay Tuned for More NAVSEA/Fleet Solid Waste Conferences

To exchange information on shipboard solid waste equipment—operation, installation, design, installation schedules, and all other facets of the program—NAVSEA 03L hosted the first annual NAVSEA/Fleet Solid Waste Conference, one on each coast, in August 1997 in San Diego, CA, and

in September in Norfolk, VA. Participants included Fleet representatives, Navy Supervising Activities, Planning Yards; technical design agents, ISEAs, and Program Office personnel. The free exchange of information helped NAVSEA address many issues and gauge how well the program meets shipboard needs.

NAVSEA will host more annual conferences to share lessons learned during installation and operation of equipment, and to ensure that the solid waste program continues to support Fleet mission accomplishment by giving the Navy the tools it needs to meet its environmental responsibilities with ease.



New Technologies for Oily Waste, Graywater, and Blackwater R&D

The Navy has a lot of exciting, on-going R&D in the liquid-waste area. NAVSEA is directing the investigation of several technologies for future and some existing ships.

Improved Bilge Cleaning: OWS and Bilgewater Polishers

A program is under way to identify, test, and evaluate commercially available bilge cleaners compatible with oil/water separators (OWSs). Many bilge cleaners the Navy uses today contain long-lasting emulsifying agents, which produce stable oil-in-water emulsions that shipboard OWSs cannot effectively process. OWS-compatible bilge cleaners produce short-lived emulsions and do not affect separator coalescing plates, conductivity sensors, or oil-content monitor (OCM) readings. Test protocols for OWS compatibility and cleanability criteria are being developed into a commercial item description, to be used for buying bilge cleaners.

The Navy's existing OWSs are very effective in removing the bulk (non-emulsified) oil



from bilgewater. When properly operated and maintained, these parallel-plate OWS systems consistently will achieve the required discharge limits. Ships of the future, however, will use an improved "dry bilge" design with higher concentrations of oil in the bilgewater. Navy researchers have identified **ultrafiltration**, using commercially available ceramic membranes, as a promising technology to polish OWS efflu-

ent effectively. A prototype ultrafiltration polishing system installed on the USS *Carney* (DDG-64) produced excellent initial results: a concentration ratio of 100-to-1 and a consistent effluent oil concentration that meets the 15-ppm standard. This prototype system was recently replaced on board the *Carney* with an improved test system that is smaller, lighter, and more rugged. An engineering development model is being installed on LSD-41-class ships.

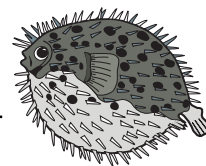
◀ **Meeting discharge limits:** This prototype oily-waste ultrafiltration polishing system aboard the USS *Carney* (DDG-64) removed oil from OWS effluent to less than 15 ppm using ceramic membranes

Another OWS effluent polishing technology is under development for smaller ships for which the ultrafiltration-membrane technology is not suitable. This simple **sorption process** has achieved effluent with oil concentrations of 15 ppm, but more work is needed to identify the best sorbent media for this application and

continued on page 9

PROGRAM UPDATE

Thermal-Destruction Design Improvements Pay Off Twofold



The Navy destroyer USS *Thorn* (DD-988) saved \$7,800 during a recent 3-day port visit to St. Croix by restoring the operation of two 0.5 gal/min onboard vortex sewage incinerators. A NAVSEA (03R16)-funded R&D project helped NSWCCD engineers identify design, operation, and maintenance improvements for shipboard vortex sewage incinerators.

The problem was that the cooling-air passage between the intermediate shell and the outer shell were blocked with solidified ash and rust, leading to the diagnosis of a material failure that had caused operational problems for years. The blockage made the incinerator operate at a higher temperature, causing system failures and accelerating hot corrosion and fatigue of the expensive Inconel components. After unsuccessful attempts to

clear this passage, NSWCCD removed the intermediate shell, cleared the blockage, and installed a new intermediate shell. The original shell was constructed from carbon steel; the new one is 304 stainless steel (to reduce the potential for future rust blockages). With the new intermediate shell and cleared cooling-air passage, the incinerator's inner liner and outer shell operate at normal design temperatures. This improvement was first installed in both vortex sewage incinerators aboard the *Thorn*. Another destroyer, the USS *Peterson* (DD-969), heard of the success aboard the *Thorn* and requested the same retrofit on its number-2 incinerator. Feedback from both ships has been positive.

Not only does vortex incineration save the Navy money, it also helps the Navy comply with regulations for overboard liq-

uid-waste discharges.

NSWCCD is developing a modified vortex incinerator, to be the basis for an advanced shipboard thermal-destruction system that complies with applicable air-emission regulations and destroys all nonhazardous liquid waste: vacuum-collected blackwater; waste oil; and concentrated graywater, blackwater, and oily wastewater (see diagram on page 9). Commercial market surveys show it is the most suitable shipboard liquid-water thermal-destruction system available.

NSWCCD is preparing documentation to transition the intermediate shell replacement procedures to the Fleet Technical Support Center, Atlantic (FTSCLANT) and Pacific (FTSCPAC) to assist other DD-963- and DDG-993-Class ships in restoring the operation of their vortex incinerators. 🐡

Oily Waste, Graywater, and Blackwater R&D

continued from page 8

to optimize the system design. Work also is under way to develop a more sensitive and reliable OCM to support new polishing systems.

High-Capacity OWS

The *high-capacity oil/water separator* (HCOWS) was developed for CVN-68-Class aircraft carriers to process their oily waste and provide an overboard discharge that meets the discharge requirements. The HCOWS is a high-flow-rate, 100–200 gallon-per-minute oily wastewater treatment system that uses parallel-plate technology placed in a tank void to minimize shipboard space impact. Installed aboard USS *Dwight D. Eisenhower* (CVN-69) in October 1994, several modifications have been made to correct HCOWS operational problems and enhance its operability and performance.

The HCOWS has processed over 2 million gallons of oily waste, both in port and at sea, since March 1997. A performance demonstration of the system occurred between 8 July 1997 and 20 October 1997. Results of



In the laboratory, the Navy's prototype graywater ultrafiltration system achieves a volume reduction of 20:1

128 samples showed the mean effluent oil-in-water concentration to meet consistently the 15-ppm discharge standard. A draft MILSPEC Technical Manual has been completed and is being validated during the performance demonstration. Transition of the HCOWS to the CVN-77 is planned for late FY 1998.

Graywater, Sewage Treatment

The Navy has identified *ultrafiltration*, using commercially available polymeric membranes, as a promising shipboard technology for treating non-oily wastewater (sewage and graywater). Graywater/sewage membrane systems have been tested in the laboratory and pierside with graywater and mixed graywater/sewage from naval combatants. Results

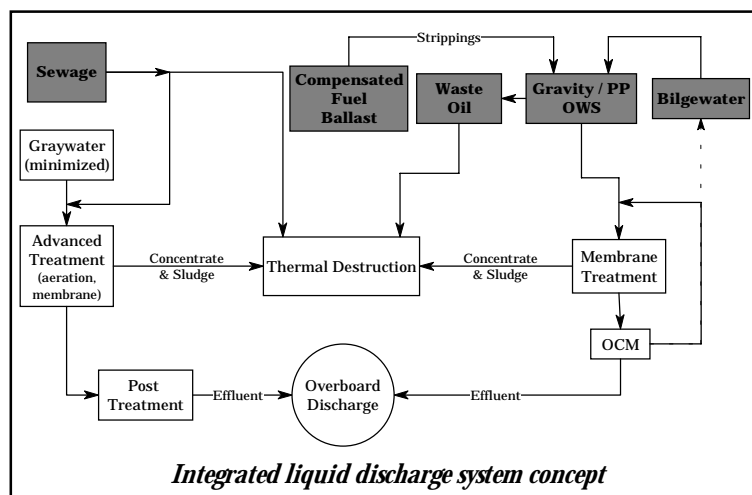
t o d a t e have demonstrated over 600 hours of stable performance (i.e., little or no membrane-performance decline) with graywater feed, but additional research is needed to improve the performance with a combined sewage/graywater

feed. Pretreatment (e.g., aerobic conditioning) and posttreatment (e.g., ultraviolet light) will be required to control biological oxygen demand and fecal coliform (bacteria), respectively, and bring them to acceptable levels for discharge. A full-scale prototype graywater large-diameter tubular membrane system is operating in the laboratory and soon will be tested aboard ship. Also, as part of an ONR technology demonstration program, a full-scale prototype in-tank hollow-fiber membrane system will be tested with combined sewage/graywater on a Navy-base pier in FY 1998 and later aboard ship. This is a cost-sharing program between the U.S. Navy, the Canadian government, and an industry partner.

Thermal Destruction

The Navy is planning an *integrated liquid discharge system* concept for the environ-

mentally sound ship of the 21st century. In this concept, ultrafiltration membrane systems would concentrate bilgewater, graywater, and sewage (as previously described); the clean effluents would be discharged; and the concentrates would be evaporated/incinerated in a thermal-destruction system. The Navy has initiated an effort to identify a suitable multifunctional thermal-destruction technology capable of destroying concentrated oily waste, concentrated graywater, concentrated sewage, and waste oil. This may be a significantly upgraded version of the Navy's existing vortex



sewage incinerator, some other type of commercial marine liquid waste incinerator, or even advanced hydrothermal oxidation (HTO) technology.

The Future: UNDS and MPCDs

New requirements for Navy shipboard management of liquid wastes are called for in a recent Amendment to the U.S. Clean Water Act. This law, Uniform National Discharge Standards (UNDS), requires the use of marine pollution control devices (MPCDs) on ships where reasonable and practicable (see page 8 of the summer issue of *Shipboard Environmental Protection News*). The Navy is working with EPA to identify those effluents that should be controlled and by what technology. Additional RDT&E may be required to develop and test new or improved liquid-waste processing systems for Navy ships. 🐙

What's New at the Clearinghouse Web Site?

www.navyseic.com

Have you checked out the new SEIC Web site? Highlights are below.

On the Solid Waste Page at <http://www.navyseic.com/solid/solid.htm> (to view these documents, you'll need a copy of the Adobe Acrobat Reader, available free from Adobe at <http://www.adobe.com/prodindex/acrobat/readstep.html>):

- ◆ The NSWCCD-SSES Plastics Waste Processor Installation Verification Checklist; and
- ◆ Descriptions of Navy Shipboard Solid Waste Management Equipment: large pulper, small pulper, metal/glass shredder, and plastics waste processor.

On the Climate Change Page at <http://www.navyseic.com/climate/climate.htm>:

- ◆ Practical Information on Saving Energy to Reduce Global Warming Emissions While Saving \$\$\$ (of interest primarily to facilities).

☞ Please bear with us as we continue to update our Web page. We would appreciate any feedback on the page, both positive and negative! Send your comments to comments@navyseic.com

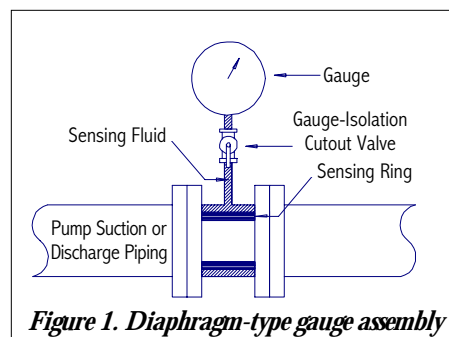
Remember to visit the UNDS homepage:
<http://www.n4.hq.navy.mil/n45b/doc/unds.html>

New Ring-Gauge Isolator for Blackwater

To improve the reliability of sanitary waste system sewage transfer-pump suction and discharge gauges, NSWCCD-SSES Codes 631 and 9153 have developed Machinery Alteration (MACHALT) 470, the ring-gauge isolator.

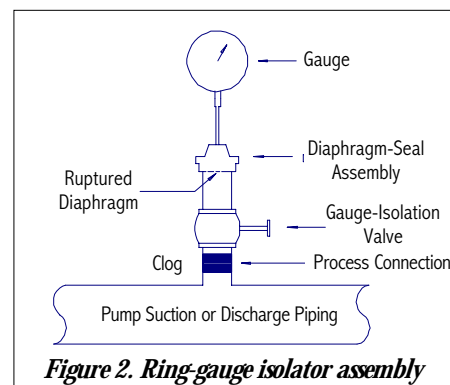
The existing diaphragm-type gauge isolator (Figure 1), which provides isolation between the process fluid (sewage) and the sensing fluid (typically glycerol) is prone to failure for two reasons: (1) the process piping clogs (from the buildup of sewage solids), making the gauges unable to properly sense process-fluid pressure; and (2) the Teflon®-coated diaphragm ruptures, leading to a loss of sensing fluid, making the gauges unable to sense process-fluid pressure.

Ship's force is unable to repair a failed diaphragm-type gauge assembly. In sewage systems without gauge-isolation cutout valves, ship's force must secure the entire



sewage system before removing or replacing a diaphragm-type gauge assembly.

These problems can be avoided with gauge assemblies equipped with ring-gauge isolators (Figure 2), which MACHALT 470 installs in sewage transfer pump suction and discharge piping. The ring-gauge isolator assembly senses pressure through an in-line liquid filled sensing ring. This ring isolates the gauge from direct



contact with sewage, using a 50/50 mixture of water and ethylene glycol as the sensing fluid. Changes in pressure caused by sewage-transfer pump operation or static head pressure in the sewage-transfer piping cause the sensing ring to deflect and displace the sensing fluid in the sensing ring. This, in turn, is sensed by the gauge.

The in-line design of the ring-gauge isolator and the fact that the sensing ring's inner wall (sewage-contact side) is constantly "cleaned" by the flow of sewage during transfer-pump operation prevents clogs. Repairing a gauge-isolator assembly is within ship's force capability and requires no special tools.

NSWCCD Annapolis has tested the land-based concept; initial shipboard testing was performed on the USS *Simon Lake* (AS-33), while prototype MACHALT 470 was installed on the USS *Trenton* (LPD-14). Additional gauge-isolator assemblies were installed as part of the sewage-system eddy pump Ship Alteration installations performed on CV- and CVN-Class ships.

Ring-gauge isolator assemblies also are used for DD-963/DDG-993-Class Alteration Equivalent Repair (AER) No. 11/91 to improve the reliability of the sewage system transfer/dump pump protection circuit on these ship classes. 🐼



You're Covered by New Paint Regulations

New national emission standards for hazardous air pollutants (NESHAP) became effective 16 December 1997 for ship-surface-coating operations (40 CFR 63, subpart ii). NESHAP applies to shore

facilities but requires shore and shipboard use of NESHAP-compliant marine coatings. The Navy is prepared: marine coatings in the supply system already meet VOC-content standards. NESHAP regulates surface-coating operations

performed by civilian work force, contractors, and ship's force that occur at affected Navy and commercial shipyards. Fortunately, EPA

continued on page 11



PUT A CHRIMP IN IT!

Ship-Class-Specific Hazardous Material Minimization Centers



In December of 1993, the CNO issued the Consolidated Hazardous Material Reutilization Management Program (CHRIMP) manual as the new Navy standard for shipboard hazardous materials (HM) management. CHRIMP requires the establishment of a Hazardous Material Minimization Center (HAZMINCEN) on each ship for the centralized management of all shipboard HM, used/excess HM, and empty HM containers. The HAZMINCEN is the central point for all HM issued aboard ship. In general, the HAZMINCEN will issue no more HM than the work center needs to complete a maintenance action. Any unused portion must be returned to the HAZMINCEN, which recoups unused HM for reissue and consolidates used/excess HM into larger containers until it can be offloaded.

A software program, Hazardous Material Inventory and Control System (HICS), was issued with the CHRIMP manual. HICS is designed to help manage the inventory of HM that is available for issue and track the HM that has been issued. Another HICS component, the Hazardous Material Tracking and Environmental Compliance software program, is designed to help the HAZMINCEN manage the used/excess HM and empty HM containers.

A message from the Commanders in Chief of the U.S. Atlantic Fleet (CINCLANTFLT), 301801Z JULY 1993, and Pacific Fleet (CINCPACFLT), 010525Z FEB 1994, directed Type Commanders to establish CHRIMP aboard their ships. *OPNAVINST*

5100.19C, change 1 of May 15, 1996, required Type Commanders to designate ships in which physical consolidation of HM is feasible. Once designated by the Type Commander, surface ships are to establish and operate an onboard HAZMINCEN.

NSWCCD-SSES (Code 631) began conducting ship surveys (they are 75-percent complete) to validate the status of the Fleet's establishment of HAZMINCENs and determine if it was feasible on certain ship classes that have space constraints. As a result of these class-specific surveys, recommendations about conversion and/or redesignation of spaces, as necessary, were made to help ships comply with General Specifications (GENSPECS)/Government Supply Office (GSO) requirements for HM storage. Based on these recommendations, Ship Alteration packages will be developed.

Type Commanders will be requested to direct ships under their cognizance to establish and operate an onboard HAZMINCEN in accordance with these recommendations. For those ship classes that require Ship Alterations, recommendations will be provided for interim locations.

☛ Your NSWCCD Philadelphia (Code 631)
POC: Mr. Sanjiv Ruparelia, 215/897-7701, DSN 443-7701,
rupareli@mailgate.navsses.navy.mil

☛ Your NAVSEA/NSWCCD POC: Mr. Bruce Lundy, 215/897-7640

NAVSEA Replacing P-D-680 Type II

NAVSEA has initiated a program to reduce the procurement and use of the petroleum-based, dry-cleaning and degreasing solvent known as FEDSPEC P-D-680 Type II. Used on a wide variety of shipboard systems, it contains volatile organic compounds (VOCs) that contribute to air pollution. Some U.S. regions (California's south coast, San Diego County, and Bay Area air-quality management districts) have severe restrictions on emitting VOCs. P-D-680 Type II also has a flash point well below the NSWCCD-established criteria for targeting compounds to minimize and substitute.

As a first step, NSWCCD Philadelphia (MSG 271139Z JUN 95) requested substituting P-D-680 Type III for P-D-680 Type II upon depletion of current stocks of Type II. Type III has a higher flashpoint, lower aromatic content, and lower vapor pressure, which reduces hazards to the individual and to the environment. It also is available in the supply system with the following NSNs and associated container sizes:

- 6850-01-331-3349 (5 gallons)
- 6850-01-331-3350 (55 gallons)
- 6850-01-377-1808 (1 quart)
- 6850-01-377-1809 (1 gallon)
- 6850-01-377-1811 (1 pint)
- 6850-01-377-1812 (bulk, gallons)
- 6850-01-377-1916 (4 ounces)

P-D-680 Type III Standard PMS Identification Guide (SPMIG) number is 2283. NSWCCD-SSES (Code 631) is changing all Maintenance Requirement Cards (MRCs) that require P-D-680 Type II to require Type III. MRCs are being updated with the technical approval from the In-Service-Engineer (ISEA) and/or Life-Cycle Manager. NSWCCD-SSES also prohibited Type II on the Shipboard HAZMAT List, except in specific applications where no substitute has yet been found.

☛ Your NSWCCD-SSES technical POC: Mr. Sanjiv Ruparelia, Defense Secure Network, 215/897-7701, DSN 443-7701
☛ Your NAVSEA/NSWCCD POC: Mr. Bruce Lundy, 215/897-7640

NESHAP's Got You Covered!

continued from page 10

granted the Navy's request to exclude the marine-coating-use recordkeeping-and-reporting requirement for painting performed by ship's force, except during overhauls. Ship's force, however, will have to use paints that comply with the VOC-content standards.

☛ Your POC for ship-surface-coating NESHAP information: Mr. Michael Bonanno, N452e, 703/602-9434, fax 703/602-5364, bonannom@n4.opnav.navy.mil

Farewell to CFC & Halon Elimination Team Members Greg Brunner and David Breslin, SEA 03L14

Mr. *Greg Brunner* of the CFC & Halon Elimination Team recently left NAVSEA Headquarters to work in the indoor air quality field at the U.S. Environmental Protection Agency (EPA). Greg's presence will be sorely missed.

While at NAVSEA, Mr. Brunner managed the research and development efforts of the CFC & Halon Elimination Program and played an instrumental role in the EPA Significant New Alternatives Policy Pro-

gram (SNAP) approval of refrigerant HFC-236fa as an alternative to CFC-114.

Prior to working at NAVSEA Headquarters, Greg was employed by NSWC Annapolis, where he supported the Team in developing CFC-12 AC&R conversion technology.

Mr. David Breslin, NAVSEA's ODS Elimination Team Leader, has left the ODS Elimination program to take a new job as Director of Technical Operations for the

Naval Surface Warfare Center (NSWC HQ Code 04).

A tremendous asset to the Navy's ODS Elimination Team over the last four years, David's talents will be missed. Pending a replacement for Mr. Breslin, all queries can be made to Mr. Joe Thill or Mr. Greg Toms of NAVSEA 03L14.

The entire ODS Elimination Team wishes Greg and David "Fair winds and following seas." The stratosphere salutes you both! 🌊

Navy Cleans House in Montreal, Bringing Home Three EPA "Best of the Best" Awards for NRL, NSWCCD, and NAVSEA

continued from page 4

system being implemented aboard Army watercraft; and disseminated its research results and shared information worldwide through various forums and publications.

NSWCCD, Annapolis and Philadelphia Detachments. To ensure protection of the environment while preventing a negative impact on the Navy's National defense mission, the Navy established an aggressive program in 1993 to convert shipboard CFC systems. NSWCCD will convert the Navy's 1,056 CFC-12 plants to HFC-134a by the year 2001. It is also developing ozone-friendly AC&R systems for new-construction ships and converting 560 CFC-114 systems to HFC-236fa by 2009.

By September 1997, NSWCCD's leadership resulted in the conversion of 435 AC&R systems aboard Navy ships, with a total installed charge in excess of 45 tons of ozone-depleting refrigerant, and has converted or helped convert more than 150 CFC-12-free ships and Army watercraft around the world.

Mr. Joel Krinsky, NAVSEA. As Program Director, Mr. Krinsky prepared the first comprehensive Navy CFC & Halon Program Plan and helped get the program funded. As a result of his prudent planning and aggressive

advocacy, the program included major efforts in developing alternatives for shipboard cooling and fire-protection systems, solvents, and cleaning agents, and ODS recovery-and-recycling equipment. Mr. Krinsky also established the CFC and Halon Information Clearinghouse, which has helped the Navy and other ODS users understand the need for an ODS phaseout. Mr. Krinsky's program supported and guided the review of about 8,000 military specifications and standards that potentially required ODS use. In addition, he coordinated the Navy's development of Halon-recycling equipment and the transfer of this technology to industry, other Government agencies, and foreign governments.

Other U.S DOD award winners:

- **Gary D. Vest**, Principal Assistant Deputy Under Secretary of Defense (Environmental Security)
- **E. Thomas Morehouse, Jr.**, formerly of the Office of Deputy Under Secretary of Defense (Environmental Security)
- **Ronald W. Sibley**, Defense Logistics Agency
- **Army Acquisition Pollution Prevention Support Office (AAPPSO)**
- **Dr. Daniel P. Verdonik**, formerly of AAPPSO
- **Air Force Space Launch Programs**
- **Lockheed Martin Corporation**
- **Raytheon TI Systems**

Congratulations to all of these Navy and DOD ozone champions! 🌊



NSWCCD award winners (left to right): Mr. Vince Cancila, Philadelphia laboratory; Mr. Dick Helmick, Annapolis laboratory; Mr. Vince DiFilippo, Philadelphia laboratory; and CAPT John H. Preisel, the NSWCCD Commander



Spotlight on Brad Smith and John Julian of SEA 03L

ALPHABET SOUP FOR NON-NAVY TYPES

What do all those acronyms mean, anyway? This quick-reference glossary will guide you through the plethora of naval abbreviations in this issue:

AC&R: Air conditioning and refrigeration
 ADM: Admiral
 ASNE: American Society of Naval Engineers
 CAPT: Captain
 CFC: Chlorofluorocarbon
 CDR: Commander
 CNO: Chief of Naval Operations
 DOD: Department of Defense
 EPA: Environmental Protection Agency
 FY: Fiscal year
 HCFC: Hydrochlorofluorocarbon
 HFC: Hydrofluorocarbon
 IMO: International Maritime Organization
 LCDR: Lieutenant Commander
 LTCOL: Lieutenant Colonel
 MARPOL: Marine Pollution; International Convention for the Prevention of Pollution from Ships
 MILSPEC: Military specification
 MSG: Message
 NATO: North Atlantic Treaty Organization
 nm: Nautical mile
 NAVAIR: Naval Air Systems Command
 NAVFAC: Naval Facilities Engineering Command
 NAVSEA: Naval Sea Systems Command
 NAVSUP: Naval Supply Systems Command
 NSN: National Stock Number
 NSWC: Naval Surface Warfare Center
 NSWCCD: Naval Surface Warfare Center, Carderock Division
 NSWCCD-SSES: Naval Surface Warfare Center, Carderock Division, Ship Systems Engineering Station
 ODS: Ozone-depleting substance
 ONR: Office of Naval Research
 OPNAV: Office of the CNO (above)
 OPNAVINST: OPNAV Instruction
 ppm: Parts per million
 PMS: Planned Maintenance System
 POC: Point of contact
 RADM: Rear Admiral
 R&D: Research and development
 RDT&E: Research, development, test, and evaluation
 SHIPALT: Ship Alteration
 UNDS: Uniform National Discharge Standards
 VADM: Vice Admiral
 VOC: Volatile organic compounds

Both Mr. Brad Smith (below left) and Mr. John Julian work together as part of NAVSEA's 03L division (Environmental and Auxiliary Systems Group).



Mr. Brad Smith (SEA 03L12) heads up the Oil Pollution Control Branch in NAVSEA's Environmental Protection Systems Division. He is responsible for managing and overseeing the procurement, installation, and life-cycle management of the equipment and systems required for the Navy's shipboard oil-pollution abatement program. Currently, the abatement program includes shipboard oil/water separators, oil-content monitors, and other oil pollution control devices for all classes of Navy ships.

Mr. Smith is also a member of the Bilge Task Action Team, a committee sponsored by the Environmental Quality Management Board, along with other representatives from NAVSEA, NAVFAC, CNO, and the Fleet.

Brad holds a Bachelor of Science degree in Petroleum Engineering from Marietta College in Marietta, OH. 🐦



As the head of NAVSEA's Sewage and Wastewater Control Branch, Mr. John Julian (SEA 03L13) is responsible for life-cycle management of sewage and graywater pollution control systems on Navy ships. These include sewage vortex incinerators; hydrogen sulfide alarm systems; biological sewage treatment systems; sewage collection, holding, and transfer systems; and vacuum sewage collection, holding and transfer systems.

Mr. Julian is also a member of the NAVSEA Environmental Working Group, chaired by SEA 00T, and is involved in developing UNDS for incidental discharges from vessels of the Armed Forces.

John received his Bachelor of Mechanical Engineering degree from Catholic University in Washington, D.C., and holds a Master of Science degree in Environmental Engineering from the University of Maryland. 🐦

Tony Rodriguez Moves to NAVSEA, Joe Pizzino to NSWC, Carderock Division

Mr. Anthony Rodriguez has left NSWCCD (Code 633) and began a temporary full-time detail to NAVSEA 03R16 supporting Mr. Anthony Nickenson 28 July 1997. Mr. Rodriguez is

replacing Mr. Joe Pizzino, who became Branch Head for Fluid Systems & Machinery Analysis (Code 824) at NSWCCD Annapolis. This code will move to NSWCCD Philadelphia next year. 🐦



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CALENDAR OF EVENTS & IMPORTANT DATES



- **Third Friday of Each Month:** *ASNE Committee on Environmental Engineering's Lunch-Time Seminars*; 1200–1300 hours (bring your lunch); held at various offices in Arlington, VA; POC: David Breslin, Breslin_David@hq.navsea.navy.mil. This schedule is subject to change:

- ♦ **January 16, 1998:** *Environmentally Benign Fire-Fighting Foam*; Mr. Joe Dunne, The 8N Corporation
- ♦ **February 20, 1998:** *Climate Change Policy & Global Warming*; Speaker TBA, U.S. Environmental Protection Agency
- ♦ **March 20, 1998:** *The CV(X) Environmental Program*; Mr. Rob Beadling and Mr. Tom Pape, JJMA
- ♦ **April 17, 1998:** *U.S. Navy's Ozone-Protection Program*; Mr. Greg Toms, NAVSEA (03L)
- ♦ **May 15, 1998:** *Elimination of ODSs from Maintenance of O₂ Systems*; Mr. Neil Antin, NAVSEA (03L)

- **11–13 May 1998:** *Environmental Summit '98, the International EH&S Conference and Expo*; Research Triangle Park, NC; POC: Brooke Ramos, 888–4ES–1998 x223, fax 919/469–4137, e-mail: bramos@ercweb.com.
- **12–14 May 1998:** *Halon Options Technical Working Conference*; Albuquerque, NM; POC: Leanne Oliver, University of New Mexico, 505/272–7250, fax 630/272–7203, <http://nmeri.unm.edu/NMERI.CGET>.
- **19–21 May 1998:** *CleanTech '98, International Cleaning Technologies Exhibition*; Rosemont, IL; POC: WPC Exhibitions, 908/788–0343 x135, fax 908/788–9381, e-mail: CleanTech98@witterpublishing.com.
- **8–11 June 1998:** *9th Global Warming International Conference and Expo*; Hong Kong; POC: World Resource Review, 630/910–1551, fax 630/910–1561.
- **24–28 August 1998:** *Annual Joint Service Pollution Prevention Conference*; San Antonio, TX; POC: American Defense Preparedness Association, 703/522–1820, fax 703/522–1885.

☞ Also check out calendars on the Web at the Navy SEIC Web Site at <http://www.navyseic.com/calendar.htm>; and DENIX at <http://denix.cecer.army.mil/denix/Public/Calendar/display.cgi>

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For technical references or subscription information, call Mr. Pete Mullenhard or Mr. D. Marc Wilson at 703/416-1132.

WHAT IS THE CLEARINGHOUSE?

The purpose of the **Navy Shipboard Environmental Information Clearinghouse** is to provide one-stop shopping for the Fleet and inform the Navy community on all shipboard environmental issues: policy, people, R&D, ozone-depleting substances, solid waste, liquid waste, hazardous materials, Uniform National Discharge Standards, and Pollution Prevention Afloat (P²A) success stories. Our extensive resources include *but are not limited to* the following:

- ▶ **Policy and Regulations.** Copies of Navy advisories, directives, instructions, and regulations.
- ▶ **Status of Shipboard Environmental Equipment Installations.** Updates on the latest technology on board ships.
- ▶ **Vendor Information.** Prices; availability; product information (MSDS, technical data sheets, and CAS #); technical reports; and user experience.
- ▶ **Alternative Chemicals.** Facts on existing and newly developed alternatives or processes including vendor, toxicity, and application data.
- ▶ **Status of Military Documents Requiring Modifications.** Specifications, maintenance requirement cards, technical manuals, etc.
- ▶ **Miscellaneous.** EPA technician-certification programs; information from industry and professional organizations; EPA rules; more.



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